

REMARKS

Claims 3, 5 and new claims 15-20 are the only active claims pending in this application. The foregoing separate sheets marked as "Listing of Claims" show all the claims in the application, each with an indication at its first line showing the claim's current status.

The Office Action rejects claims 3 and 5 under 35 U.S.C. § 103(a) as being unpatentable over what is disclosed by the collection of U.S. Patent No. 6,414,403 ("Kitagawa") and U.S. Patent No. 5,341,503 ("Gladstein"). See Office Action at pp. 3-4.

Applicants respectfully traverse the rejections as not supported by the referenced relied upon. Applicants submit the collected teachings Kitagawa and Gladstein, which show the scope and content of the prior art, lack structure within the broadest reasonable meaning of the claim 3 "output voltage detection circuit" element; lack structure within the broadest reasonable meaning of the claim 3 DC-DC converter; and lack structure within the broadest reasonable meaning of the claim 3 "switching circuit." Further, the collection of Kitagawa and Gladstein disclose nothing showing obviousness of closing the difference between closest Kitagawa and Gladstein and Applicant's claim 3 to a person or ordinary skill in the art at the time of Applicants' claimed invention.

Applicants' invention defined by claim 3 is a power source circuit for a cell (e.g., a battery) to supply voltage to a load, and to maintain the voltage above a "lower limit voltage" threshold for a time after the cell voltage falls below the threshold. The claim 3 apparatus has output terminals, a DC-DC step-up converter with an output connected to one of the output terminals, and an output voltage detecting circuit that detects a voltage across the output terminals and generates a detection signal. Claim 3, currently amended, at lines 4-11. The claim 3 invention has a switch controlled by a discharge control circuit, which receives the detection signal. When the detection signal indicates a voltage across the output terminals lower than the lower limit voltage, the discharge control circuit controls the switch to switch connect the cell to the input of the DC-DC step-up converter instead of the

output terminal. The DC-DC step-up output, being connected to the output terminal, thus maintains the output terminal voltage higher than the cell voltage for a time.

Claim 3, currently amended, at lines 12-28. One example according to claim 3 is disclosed at FIG. 1, and at p. 10, line 27, through p. 13, line 16; and at p. 14, line 28, through p. 16, line 25.

Kitagawa relates to a switchable interconnection of an external power supply 1, a load 2, and an internal battery 3, through a boost/reduction converter 4 having “No. 1 switch element” and “No. 2 switch element,” controlled by the monitor 6 measuring the difference between the voltage of the external power source 1 and the battery 3. Kitagawa, at FIG. 1, and at column 4, line 59 through column 5, line 23.

As disclosed by Kitagawa, when external power source 1 is connected and the battery 3 voltage is lower than the voltage of source 1, the power source powers the load 2 and drives the converter 4, the converter 4 reducing the source 1 voltage to charge the battery 3. Kitagawa, at column 4, lines 59-67.

Kitagawa discloses nothing that measures a voltage across its load 2, and nothing that acts based on a voltage across its load 2. Kitagawa discloses nothing that switches its battery 3 to connect to an input of its converter 4. Kitagawa discloses nothing that switches its battery 3 to connect alternatively to an input of its converter 4 or to its load 2, based on anything, much less a voltage across its output terminals, i.e., across the load 2. Instead, referring to Kitagawa's FIG. 3, the battery (item 23) is always connected to the “L1-C1” node of the converter 4.

Claim 3 recites an “output voltage detecting circuit ... *detect[ing] a voltage of said output terminals* and ... generat[ing] a corresponding output voltage detection signal.” Claim 3, currently amended, at lines 8-10. See Applicants' FIG. 1, circuit 9, connected to output terminals 10 and 11 as one illustrative example meeting this claim 3 limitation.

Kitagawa discloses nothing meeting these claim 3 “output voltage detecting circuit” limitations.

The Office Action's position is that Kitagawa's Fig. 1, item 6 meets claim 3 “cell voltage detecting circuit” and the claim 3 “output voltage detecting circuit.”

Office Action, at p. 3, lines 6-9. The Office Action's position is not consistent with the claim 3 language and is not consistent with Kitagawa's disclosure.

Kitagawa's Fig. 1 item 6 is in fact a "charge/discharge monitor" connected to, and detecting only the "Vbat" voltage of the battery 3. The claim 3 "output voltage detecting circuit" is not defined as detecting battery voltage, though; it is defined as detecting voltage *across the output terminals*. Claim 3, currently amended, at lines 8-10. The claim 3 "cell voltage detecting circuit," at line 5, detects the cell voltage. Kitagawa's Fig. 1 item 6 may indeed meet the claim 3 "cell voltage detecting circuit." That is all that Kitagawa's Fig. 1 item 6 meets.

Applicants submit interpreting Kitagawa's Fig. 1 item 6 to meet the claim 3 "output voltage detecting circuit" requires reading limitations out of claim 3, namely the claimed "output terminals," "output voltage detecting circuit," "switching circuit", and "discharge control circuit," and/or requires adding subject matter to Kitagawa, namely adding a circuit measuring the voltage across Kitagawa's Fig. 1 load 2, as well as modifying Kitagawa's "monitor circuit" 6 to connect to and operate based on the load 2 voltage instead of the battery 3 voltage.

Kitagawa therefore lacks the claim 3 "output voltage detecting circuit." limitations.

Kitagawa discloses nothing meeting the claim 3 "DC-DC converter" limitations.

Claim 3 defines the DC-DC converter as

having a first input connected to said switching circuit, a second input to receive the output voltage detection signal ... and a step-up output connected to one of said output terminals

Claim 3, currently amended, at lines 16-19.

Kitagawa does not teach or disclose any structure within the broadest reasonable meaning of the claim 3 DC-DC having "a first input connected to said switching circuit." Kitagawa's converter 4 cannot meet this limitation because Kitagawa's converter 4 does not have "a first input connected to" any "switching circuit." Kitagawa's battery 3 is always connected to the input of the converter 4. There is no switch between Kitagawa's battery 3 and the converter 4. See Kitagawa

at Fig. 3, showing the battery (item 23) connected directly to the “L1”-“C1” node of the converter 4.

Kitagawa does not teach or disclose any structure within the broadest reasonable meaning of the claim 3 DC-DC converter having “a second input connected to receive the output voltage detection signal from said output voltage detecting circuit.” Claim 3, currently amended, at lines 17-18. Kitagawa’s converter 4 is not such a teaching or disclosure, because it receives and operates based on a measurement of the voltage of the battery 3, not a measurement of the voltage at the load 2.

Kitagawa lacks the claim 3 “switching circuit.” The claim 3 switching circuit is defined as controlled based on the output voltage, with one switch input connected to the cell, one switch output connected to one of the device output terminals, and one output connected to the DC-DC step-up converter, “to alternatively switch a positive electrode of said cell to one of said output terminals or said step-up DC-DC converter.” Claim 3, currently amended, at lines 11-13, 16-17 and 20-22.

Kitagawa “No. 1 Switching Element” and “No. 2 Switching Element” 2 cannot meet these limitations because, among other reason, these are components of its DC-DC converter 4. Further, Kitagawa “No. 1 Switching Element” and “No. 2 Switching Element” cannot meet these “switching circuit” limitations because, turning to Kitagawa’s Fig. 3, the battery (item 23) is always connected to the input of the converter 4. There is no switch between Kitagawa’s battery 23 and the converter 4. On the contrary, battery 23 simply connected directly to the “L1”-“C1” node of the converter 4.

The Office Action’s statement that Kitagawa’s Fig. 1, item 4, embodies the claim 3 “switching circuit” is not consistent with Kitagawa and is not consistent with the claim 3 language. Kitagawa’s “No. 1 Switch Element” and “No. 2 Switch Element,” as stated above, are components of Kitagawa’s converter 4, controlling and forming the internal mode and operation of the converter 4. Kitagawa’s “No. 1 Switch Element” and “No. 2 Switch Element” are not within, and cannot be reasonably asserted as meeting the claim 3 switching circuit limitations of

“alternatively switch[ing] a positive electrode of said cell to one of said output terminals or said step-up DC-DC converter.”

The secondary reference, Gladstein, is relied upon as teaching a detection of a rate of battery voltage drop and of computing a discharge curve. Applicants respectfully respond that Gladstein adds nothing to Kitagawa having any arguable relation to Applicants' claim 3 as currently amended.

Applicants respectfully request, for at least the foregoing reasons, that the rejection of claim 3 be reconsidered and withdrawn.

Claim 5 depends from claim 3, and is therefore patentable over Kitagawa and Gladstein for at least the reasons that claim 3 is patentable over these references.

New claim 17 defines a cell pack having, among other limitations, substantively all of the limitations defined by claim 3. Applicants respectfully submit that new claim 17 is therefore patentable over Kitagawa and Gladstein for at least the reasons presented above by which claim 3 is patentable over these references.

New dependent claim 18 depends from new claim 17, and adds limitations substantively similar to claim 5.

New dependent claims 15, 16, 19 and 20 depend from claims 3 and 17, respectively, and therefore patentable over Kitagawa and Gladstein for at least the reasons presented above by which claim 3 is patentable over these references.

With respect new dependent claims 16 and 20, one illustrative example description may be seen at page 16, lines 3-15.

Conclusion

In view of the foregoing, Applicants respectfully request that the application be reconsidered, that claims 3, 5, and 15-20 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Laurence E. Stein', written over the typed name.

Laurence E. Stein

Reg. No. 35,371

Whitham, Curtis, Christofferson and Cook, P.C.
11491 Sunset Hills Road, Suite 340
Reston, VA 20190

Tel. (703) 787-9400
Fax. (703) 787-7557

Customer No.: 30743